CLAIMS

1. A method of compensating for a radiation pattern in a radio system, the method comprising:

forming (420) a primary radiation pattern (500) by weighting signals of at least two functional antenna branches of a base station,

characterized by

disconnecting (440) at least one antenna branch; and

forming (450) a radiation pattern (700) which compensates for the primary radiation pattern (500) by weighting signals of the functional antenna branches.

2. A method of weighting signals in a radio system, the method comprising:

weighting signals of at least two functional antenna branches of a base station with primary weights to form a primary radiation pattern (500),

characterized by

disconnecting at least one antenna branch; and

weighting signals of the functional antenna branches with weights which compensate for the primary weights to form a compensating radiation pattern (700).

3. A method according to claim 2, **characterized** by weighting signals of the functional antenna branches with previously known weights.

4. A method according to claim 2, **characterized** by weighting signals of the functional antenna branches with weights which differ from the primary weights.

5. A method according to claim 1 or 2, **characterized** in that the primary radiation pattern (500) is fixed and the compensating radiation pattern (700) is fixed.

6. A method according to claim 1 or 2, **characterized** in that the primary radiation pattern (500) is the radiation pattern used in transmission, the disconnected antenna branch is the transmitting antenna branch, and the compensating radiation pattern (700) is the radiation pattern used in transmission.

7. A method according to claim 1 or 2, **characterized** in that the primary radiation pattern (500) is the radiation pattern used in transmission, the disconnected antenna branch is the transmitting antenna branch, and the

compensating radiation pattern (700) is the radiation pattern used in transmission; and

a radiation pattern which is to be used in reception and corresponds to the compensating radiation pattern (700) used in transmission is formed by weighting signals of the receiving antenna branches.

8. A method according to claim 1 or 2, **characterized** in that the primary radiation pattern (500) is the radiation pattern used in reception, the disconnected antenna branch is the receiving antenna branch, and the compensating radiation pattern (700) is the radiation pattern used in reception.

9. A method according to claim 1 or 2, **characterized** in that the primary radiation pattern (500) is the radiation pattern used in reception, the disconnected antenna branch is the receiving antenna branch, and the compensating radiation pattern (700) is the radiation pattern used in reception; and

a radiation pattern which is to be used in transmission and corresponds to the compensating radiation pattern (700) used in reception is formed by weighting signals of the transmitting antenna branches.

10. A method according to claim 1 or 2, **characterized** by forming (450) the radiation pattern (700) which compensates for the primary radiation pattern (500) by weighting signals of the functional antenna branches so that compensation occurs in the azimuth direction.

11. A method according to claim 1 or 2, **characterized** by forming (450) the radiation pattern (700) compensating for the primary radiation pattern (500) by weighting signals of the functional antenna branches so that compensation occurs in the elevation direction.

12. A method according to claim 1 or 2, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches with previously known weights.

13. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches with weights which differ from the weights used for forming the primary radiation pattern (500).

14. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches digitally.

15. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches with weights which are based on the configuration of the functional antenna elements in the antenna array.

16. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches with weights which are based on the radiation patterns formed by single antenna elements.

17. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches with weights which are based on the weighting function of the aperture of the antenna array.

18. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches so that the main beams (710-720) of the compensating radiation pattern (700) overlap at least partly with the main beams (510-520) of the primary radiation pattern (500).

19. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches so that at least one main beam (510-520) of the primary radiation pattern (500) is compensated with at least one main beam (710-720) of the compensating radiation pattern (700).

20. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches so that at least one main beam (710-720) of the primary radiation pattern (500) is compensated with one main beam (510-520) of the compensating radiation pattern (700) and coding of the signals of the compensating main beam (710-720) is the same as the coding of the signals of the main beam (510-520) to be compensated for.

21. A method according to claim 1, **characterized** by forming (450) the compensating radiation pattern (700) by weighting signals of the functional antenna branches so that at least one main beam (710-720) of the primary radiation pattern (500) is compensated with one main beam (510-520) of the compensating radiation pattern (700) and the identification signal of the compensating main beam (710-720) is the same as the identification signal of the main beam (510-520) to be compensated for (500).

22. A method according to claim 1, **characterized** by forming (450) the compensating antenna beam structure (700) by weighting signals of the functional antenna branches so that the dynamic range of the main beams (710-720) of the compensating radiation pattern (700) is optimized.

23. A method according to claim 1, **characterized** by calibrating (460) the functional antenna branches after the compensating radiation pattern (700) has been formed (700).

24. A method according to claim 1, **characterized** by forming (430) a command for disconnecting at least one antenna branch; and

disconnecting (440) said at least one antenna branch on the basis of the command formed.

25. A radio system comprising:

a base station (204) for forming a radio interface of the radio system;

the base station (204) comprises at least two antenna branches (310A, 310B) for establishing a radio link to terminals;

each antenna branch (310A, 310B) comprises at least one antenna element (236, 238) for forming an antenna array (240); and

the base station (204) comprises means (216) for weighting signals of the functional antenna branches (310A, 310B) for forming a primary radiation pattern (500),

characterized in that

the base station (204) is arranged to disconnect at least one antenna branch (310A, 310B); and

the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) to form a radiation pattern (700) which compensates for the primary radiation pattern (500).

26. A radio system according to claim 25, **characterized** in that the base station (204) is arranged to form a fixed primary radiation pattern (500); and

the weighting means (216) are arranged to form a fixed compensating radiation pattern (700).

27. A radio system according to claim 25, **characterized** in that the antenna branches (310A, 310B) are arranged to transmit a signal;

the weighting means (216) are arranged to weight transmission signals of the antenna branches (310A, 310B);

the base station (204) is arranged to disconnect at least one transmitting antenna branch (310A, 310B); and

the weighting means (216) are arranged to weight the transmission signals of the functional antenna branches (310A, 310B) to form a radiation pattern (700) for transmission which compensates for the primary radiation pattern (500) used for transmission.

28. A radio system according to claim 25, **characterized** in that the antenna branches (310A, 310B) are arranged to transmit a signal;

the weighting means (216) are arranged to weight transmission signals of the antenna branches (310A, 310B);

the base station (204) is arranged to disconnect at least one transmitting antenna branch (310A, 310B);

the weighting means (216) are arranged to weight transmission signals of the functional antenna branches (310A, 310B) to form a radiation pattern (700) for transmission which compensates for the primary radiation pattern (500) used in transmission; and

the weighting means (216) are also arranged to weight receiving signals of the antenna branches (310A, 310B) so that the radiation pattern for reception corresponds to the compensating radiation pattern (700) used in transmission.

29. A radio system according to claim 25, **characterized** in that the antenna branches (310A, 310B) are arranged to receive a signal;

the weighting means (216) are arranged to weight reception signals of the antenna branches (310A, 310B);

the base station (204) is arranged to disconnect at least one receiving antenna branch (310A, 310B);

the weighting means (216) are arranged to weight reception signals of the functional antenna branches (310A, 310B) to form a radiation pattern (700) for reception which compensates for the primary radiation pattern (500) used in reception; and

the weighting means (216) are also arranged to weight transmission signals of the functional antenna branches (310A, 310B) so that the radiation pattern formed for transmission corresponds to the compensating radiation pattern (700) used in reception.

30. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the antenna branches (310A, 310B) so that compensation occurs in the azimuth direction.

31. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) so that compensation occurs in the elevation direction.

32. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) with previously known weights to form the compensating radiation pattern (700).

33. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches digitally to form a compensating radiation pattern (700).

34. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) with weights which are based on the configuration of the functional antenna elements (236, 238) in the antenna array (240).

35. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) with weights which are based on the radiation patterns formed by single functional antenna elements (236, 238).

36. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) with weights which are based on the weighting function of the aperture in the antenna array 240.

37. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) so that the main beams (710-720) of the compensating radiation pattern (700) overlap at least partly with the main beams (510-520) of the primary radiation pattern (500).

38. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) so that at least one main beam (510-520) of

the primary radiation pattern (500) is compensated with at least one main beam (710-720) of the compensating radiation pattern (700).

39. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) so that at least one main beam (510-520) of the primary radiation pattern (500) is compensated with one main beam (710-720) of the compensating radiation pattern (700) and the coding of the signals of each compensating main beam (710-720) is the same as the coding of the signals of the main beam (510-520) to be compensated for.

40. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) so that at least one main beam (510-520) of the primary radiation pattern (500) is compensated with one main beam (710-720) of the compensating radiation pattern (700) and the identification signal of each compensating main beam (710-720) is the same as the identification signal of the main beam (510-520) to be compensated for.

41. A radio system according to claim 25, **characterized** in that the weighting means (216) are arranged to weight signals of the functional antenna branches (310A, 310B) so that the dynamic range of the main beams (710-720) of the compensating radiation pattern (700) is optimized.

42. A radio system according to claim 25, **characterized** in that the base station (204) comprises means (210, 242, 244) for calibrating the antenna branches (310A, 310B).

43. A radio system according to claim 25, **characterized** in that the base station (204) is arranged to form a command for disconnecting at least one antenna branch (310A, 310B); and

the base station is arranged to disconnect said at least one antenna branch (310A, 310B) on the basis of the command formed.